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COMPLETE SPECIFICATION.

Improved Gas Heater for Buildings and the like.

We, WILLIAM WALLACE HOLMES, Manufacturer, and WILLIAM JOSEPH CONNER, Gentleman, both of Los Angeles, in the County of Los Angeles, and State of California, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly  
5 described and ascertained in and by the following statement:—

This invention relates to improvements in gas heaters, and particularly to stoves which are adapted to be set into the floors or walls of buildings or structures so as to make it possible to heat pure air and drive it into the rooms of a building without its being mixed with the products of combustion.

10 According to the invention I provide improved means whereby I obtain additional heating surfaces and better circulation, and outflow of the products of combustion, and also inflow of fresh air. These objects are attained by constructions more fully described hereafter and defined in the claims.

In the accompanying drawing, forming a part of this specification,  
15 Fig. 1 is an end elevation of a floor stove or heater constructed in accordance with this invention, and joists adjacent thereto and floor being also shown.

Fig. 2 is a vertical, transverse, sectional view through the heater or stove shown in Fig. 1.

Fig. 3 is a vertical, longitudinal sectional view taken upon the line 3—3 of  
20 Fig. 2.

Fig. 4 is a horizontal sectional view taken upon the line 4—4 of Fig. 3.

Fig. 5 is a horizontal sectional view taken upon the line 5—5 of Fig. 3.

Fig. 6 is a vertical, transverse, sectional view taken through a modified form of the heater or stove and showing the same applied in the side wall of a  
25 structure or room.

In the accompanying drawing, the preferred form of structure has been illustrated, and the details and features of the invention will now be specifically described, reference being had thereto.

The heater or stove of the present invention is designed to be set into the floor  
30 of any building, structure, room or the like, or into the side wall of a closet or other enclosure within a room, and so located that the cool air from the floor of the room or building may be caused to pass around a heated fire box and be delivered through heat flues into the room or building again. The heater is also so designed that the air for combustion may be taken from any source  
35 as for instance from the basement, cellar or outside of a building and passed through the fire box of the stove, and then delivered, with the products of combustion, outside the room, building or structure. The oxygen from the air within a room or building is thus not employed for maintaining combustion, and the gases, fumes or other products of combustion are not brought into the build-  
40 ing, room or structure. In the said drawing, 6 indicates the outer casing forming a cold air box for enclosing the heater, and heat flues. The upper edges of the casing 6 are secured to a register top 7, the edges of which project as supporting flanges 8 by which the heater is supported in the flooring or upon the joists of a building, as clearly shown in Fig. 1. The bottom of the casing 6  
45 is closed, and an inner casing 9 is mounted within the casing 6 and spaced

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therefrom upon all sides and at the bottom, so that air entering the space between these parts will pass downwardly between the outer and inner casings, and enter the inner casing 9 from the bottom. An air space is thus extended entirely around the heated portions of the device, and the outer walls of the heater, that is to say, the casing 6 is always maintained in a cool condition, preventing any danger of fire by reason of the contact of combustible materials with the heater. The outer surface of the inner casing 9 is also preferably provided with a protecting sheathing 10 of asbestos or some fireproof material.

Located within the casing 9 is a fire box 11, in which is mounted a suitable burner 12. The lower portion of the fire box 11 is flared outwardly so that the side walls of said box are drawn inwardly and upwardly over the flame issuing from the burner 12. A contracted outlet is thus formed at 13 for the flames, the structure being such that the side walls of the fire box 11 upon which the flames play continuously, are highly heated and the air which passes upwardly through the casing 9 and over the highly heated sides of the said fire box will be instantly brought to a high temperature. The bottom of the fire box is closed by a plate 14 having a central depressed portion 15 which is formed with an inlet duct 16 for the air which is to support combustion within the fire box. The duct 16 extends through the wall of the outer casing 6 so that it may receive its air from any point outside the heater.

The products of combustion and the flames are delivered from the contracted portion 13 of the fire box into a drum 17 through a central opening in a transverse partition 18 formed upon the upper end of the fire box 11. Part of the air entering the lower end of the inner casing 9 passes upwardly through a space left between the drum 17 and said casing so as to entirely surround the same and be heated by contact with the walls of said drum. Heating flues 19 and 20 also extend upwardly through said drum 17 so as to be upon each side of the central space in said drum which first receives the flames and heated products of combustion. The heating flues 19 and 20 are open at the bottom, and top, so that the air entering the inner casing 9 passes upwardly through said flues. A top plate 21 closes the upper end of the said drum 17 so that the products of combustion cannot escape at the top, but the said plate is so constructed as to permit the air heated by the said drum to pass upwardly and out of the heater through a central register 22 and thence into the room. The central part of the drum 17 is provided with a pivoted cover 23 usually having openings 24 therein covered by mica so that they form sight openings to disclose the condition of the burner. The cover 23 is hinged at 25 so that it may be raised and a lighted taper thrust into the combustion chamber of the heater for lighting the burner. The said cover 23 is normally closed however, and the products of combustion rising from the fire box and entering the drum 17 pass between and around the heating flues 19 and 20 and finally escape through an outlet pipe or flue 26. The said outlet flue 26 is preferably located at the base of the drum 17 so that the products of combustion descend again in said drum before passing out of the same. The space between the flues 19 and 20 is closed at one end of the drum 17 by means of a plate 27 so that the products of combustion must pass entirely around the heat flues 19 and 20, before reaching the outlet flue 26 as will be clearly understood by following the arrows in Figs. 3 and 5 of the drawing. Both the partition 18 and the top plate 21 of the drum 17 are formed with outwardly extending corner projections for properly spacing the said parts within the inner casing 9 and yet leaving air spaces around the same as clearly shown in Figs. 4 and 5.

The burner employed may be of any ordinary type and is preferably such as may be used with any usual or ordinary gas supply. The said burner is provided with a suitable air and gas mixing nozzle 28 having a controlling cock 29 connected with a gas supply pipe 30. One end of the casing 6 is provided with an inwardly offset recess portion 31 to accommodate the said nozzle 28 and controlling cock 29. A rod 32 extends from the register at the top of the heater to the plug of the cock 29 so that the gas may be turned on by rotating

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the said rod 32 and without having to reach into the burner. In lighting the burner, the central portion of the register 22 is lifted off and the cover 23 opened. A key is then placed upon the end of the rod 32 for turning on the gas and a lighted taper is thrust into the combustion chamber, after which the cover 23 is closed. The heat can of course be regulated by controlling the supply of gas to the burner. The fire box 11 preferably rests on longitudinally extending bars 33 secured in the lower end of the inner casing 9. The fire box 11 with the drum 17 may be lifted from the casing 9 when it is necessary to gain access to any of the parts. The bottom of the fire box 11 is usually made separable therefrom, so that the burner can be easily put in position in assembling the parts.

The stove is also provided with means for supplying moisture to the atmosphere in the room or building heated, and for this purpose tubes 34 are suspended in the space between the casings 6 and 9, the said tubes being filled with water. The upper ends of the tubes are formed with supporting hooks or projections 35 which rest upon the bars formed in the register 7, as clearly shown in Figs. 2 and 4. The water in the said tubes will be somewhat heated by the adjacent walls of the inner portion of the mechanism, so that a small quantity of vapor will be delivered to the air which enters the room more or less continuously as the water in the tubes 34 evaporates.

Where there is any built in structure as for instance cupboard space, closet room, etc., the heater may be set in the walls thereof as preferred, instead of in the floor. Thus, as shown in Fig. 6, such a structure will have a laterally extending portion 36 formed in the casing which encloses the heater and a register 37 covers the outlet thereof in the wall 38. The upper portion of the inner casing is also extended to one side as at 39, so as to open at the said register. The heating drum is provided with a lateral extension 40 extending from its place over the fire box toward said register 37, as clearly shown in said Fig. 6. In other respects, the heater is substantially like that heretofore described. The bottom of the enclosing casing 41 is provided with an air inlet 42 arranged to take in the cold air from a point near the floor. The burner of the heater in this instance is controlled by a rod 43 which extends through the said wall 38. The fire box is reached through an opening in the top of the heater walls which is normally closed by a removable cap 44. The inner structure of the fire box and the heat flues is substantially the same as in the first form of heater described.

It will be apparent that the heater may be thus adapted to various positions within a building or structure, without departing from the spirit of the invention.

In use, the heater is found very efficient for practically instantaneous heating of air, since the inwardly converging walls of the fire box 11 are almost instantly raised to a high temperature upon the lighting of the burner, and the air which passes over the same and up through the heat flues 19 and 20 is at once also raised to a high temperature. The products of combustion are not permitted to pass into the building, thus preventing danger from fire or other asphyxiation. The stove saves room, and is easily installed in any kind of a building or structure, and delivers a steady, even heat when required. The cold air from the room or building is itself taken and heated and returned into the room, so that foul air from basements or places beneath the floor is not carried into the room or building. The control and lighting of the burner is effected without going beneath the floors of the rooms or building.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A heater adapted to be placed in the floors or walls of buildings in order to heat the various rooms thereof, having an inner casing open at the top and bottom, a fire box mounted in the lower end of said casing, a heating drum

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also mounted in said inner casing to contain the products of combustion and provide greater heating surfaces, an outer casing closed at the sides and bottom and open at the top whereby air to be heated will be directed between the casings and will pass beneath and entirely around the fire box before passing out at the upper open end of the heater, the draught inlet and outlet for the fire box passing 5 through one wall of said casing.

2. A heater as claimed in Claim 1 in which the heating drum contains two independent flues open at both ends through which the air to be heated passes, said flues being closed to all products of combustion.

3. A heater as claimed in Claims 1 and 2 in which the fire box is continued 10 by a narrow neck which conveys the products of combustion into the heating drum and then all around the heating flues containing the air to be heated and thence outside the building by means of a pipe.

4. A heater adapted to be placed in the floors or walls of buildings to heat rooms, having an inner and outer casing, means to supply the air required 15 for combustion from a source outside the room directly into the combustion chamber, means adapted to provide greater heating surfaces and to cause the products of combustion to flow upwards and downwards within a heating drum, and means to draw off the products of combustion near the bottom of the casings and to deliver said products to a point outside the room, substantially as described. 20

5. A heater as claimed in Claim 4, in which means are provided to direct the air to be heated downwardly from the room between the inner and outer casings and then upwardly between the fire box and the additional heating surfaces referred to in Claim 4, substantially as described. 25

6. A heater as claimed in any of the preceding claims in which the gas supply may be regulated by means of a handle which passes through the floor or wall, to obviate the necessity of removing the register top.

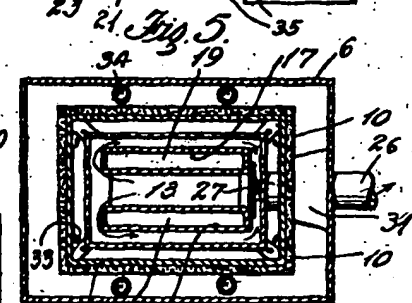
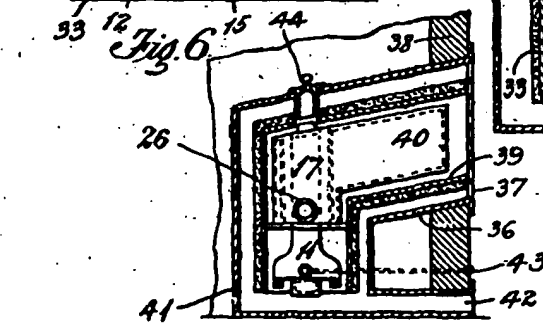
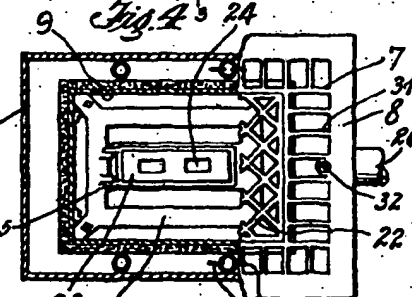
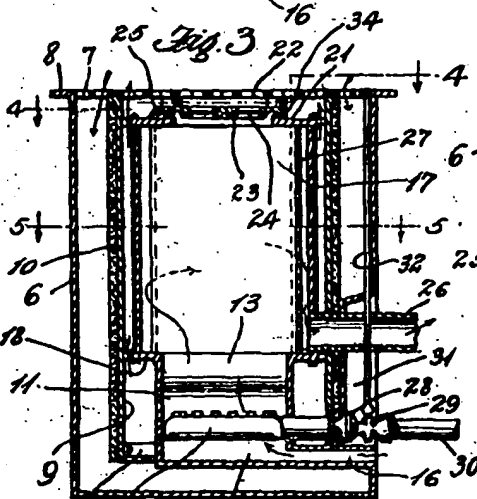
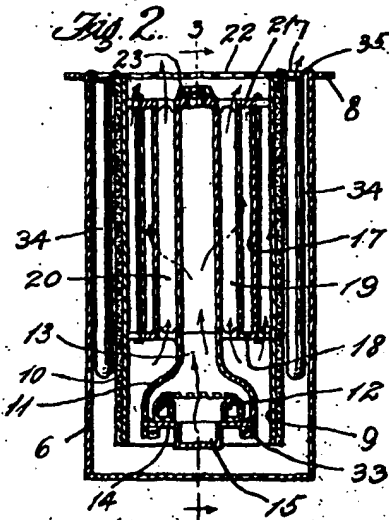
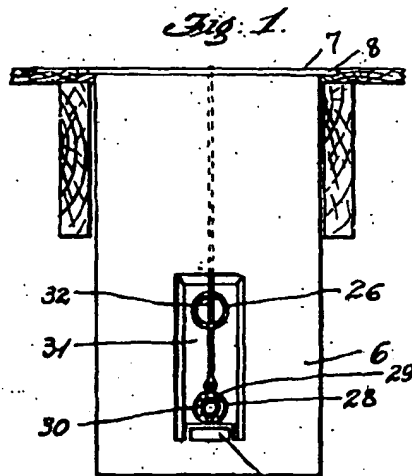
7. A heater as claimed in any of the preceding claims in which between the inner and outer casings there is suspended a tube of water which slowly evaporates, thus supplying moisture to the room. 30

8. The improved heater for use in buildings constructed substantially as described and illustrated with reference to the accompanying drawings.

Dated this 31st. day of December, 1913.

W. P. THOMPSON & Co., 35  
6, Lord Street, Liverpool, and at  
Bradford & London,  
Agents for the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]



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